

74ST57/01B/02B/05B

74ST57/01B/02B/05B

Synthesized Stereo Tuner

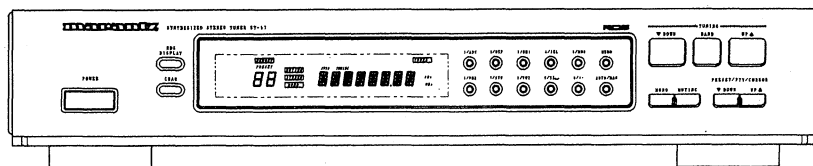


TABLE OF CONTENTS

SECTION	PAGE
1. TECHNICAL SPECIFICATIONS	1
2. TEST MODE	1
3. BLOCK DIAGRAM	3
4. SCHEMATIC DIAGRAM AND PARTS LOCATION (Pattern Side)	5
5. WIRING DIAGRAM	19
6. EXPLODED VIEW AND PARTS LIST	21
7. ALIGNMENT PROCEDURES	24
8. ELECTRICAL PARTS LIST	27

Please use this service manual with referring to the user guide (D.F.U) without fail.

marantz®

PCS 88 311

model ST-57

Printed in Japan

4822 725 51129
First Issue 1997.02
193W855020 ACT

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, **MARANTZ** company has created the ultimate in stereo sound. Only original **MARANTZ** parts can insure that your **MARANTZ** product will continue to perform to the specifications for which it is famous.

Parts for your **MARANTZ** equipment are generally available to our National Marantz Subsidiary or Agent.

ORDERING PARTS :

Parts can be ordered either by mail or by Fax.: In both cases, the correct part number has to be specified.

The following information must be supplied to eliminate delays in processing your order :

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature : any order form or Fax. must be signed, otherwise such part order will be considered as null and void.

USA

MARANTZ AMERICA, INC.
440 MEDINAH ROAD
ROSELLE, ILLINOIS 60172-2330
USA
PHONE : 630 - 307 - 3100
FAX : 630 - 307 - 2687

CANADA

LENBROOK INDUSTRIES LIMITED
633 GRANITE COURT,
PICKERING, ONTARIO L1W 3K1
CANADA
PHONE : 416-831-6333
FAX : 416-831-6936

EUROPE

MARANTZ EUROPE B.V.
P.O.BOX 80002
BUILDING SFF2
5600 JB EINDHOVEN
THE NETHERLANDS
PHONE : +31 - 40 - 2732241
FAX : +31 - 40 - 2735578

PROFESSIONAL USA

SUPERSCOPE TECHNOLOGIES, INC.
MARANTZ PROFESSIONAL PRODUCTS
1000 CORPORATE BLVD., SUITE D
AURORA, ILLINOIS 60504 USA
PHONE : 630 - 820 - 4800
FAX : 630 - 820 - 8103

PROFESSIONAL CANADA

T C ELECTRONICS CANADA LTD
540 FIRING AVE.
BAIE D'URFÉ, QUEBEC H9X 3T2
CANADA
PHONE : 514 - 457 - 4044
FAX : 514 - 457 - 5524

TRADING

MARANTZ EUROPE B.V.
P.O.BOX 80002
BUILDING SFF2
5600 JB EINDHOVEN
THE NETHERLANDS
PHONE : +31 - 40 - 2732241
FAX : +31 - 40 - 2735578

AUSTRALIA

MARANTZ AUSTRALIA
3 Figtree Drive
Australia Centre
Homebush, NSW2140 AUSTRALIA
PHONE : +61 2 742 8311
FAX : +61 2 764 3074

BRAZIL

MARANTZ BRAZIL
Caixa Postal 21462
CEP 04698-970
Sao Paulo, SP, BRAZIL
PHONE: 0800 - 123123 (Discagem Direta Gratuita)
FAX : +55 11 534. 8988

HONG KONG

FORWARD INTERNATIONAL CORP.LTD.
15 TH FLOOR, REGENT CENTRE,
88 QUEEN'S ROAD, CENTRAL, H. K.
PHONE : +852 521 - 0883
FAX : +852 521 - 7835

TAIWAN

PAI-YUING CO., LTD.
6 TH FL NO, 148 SUNG KIANG ROAD,
TAIPEI, 10429, TAIWAN R.O.C.
PHONE : +886 (2) 5221304 - 8
FAX : +886 (2) 5630415

THAILAND

MRZ STANDARD CO., LTD.
746 - 750 WANGBURAPA BANGKOK
10200 THAILAND
PHONE : +66 2222 9181
FAX : +66 2225 8871

MALAYSIA

WO KEE HONG ELECTRONICS SDN. BHD.
NO. 102 JALAN SS 21/35, DAMANSARA
UTAMA, 47400 PETALING JAYA
SELANGOR DARUL EHSAN,
MALAYSIA
PHONE : +60 3 - 7184666
FAX : +60 3 - 7173828

JAPAN Technical

MARANTZ JAPAN INC.
35-1, 7-chome, Sagami-cho
Sagamihara-shi, Kanagawa
Japan
PHONE : +81 427 44 7950
FAX : +81 427 48 0889

日本 マランツ 株式会社

本社 〒228
神奈川県相模原市相模大野 7-35-1
営業本部 〒150
東京都渋谷区恵比寿南 1-11-9

SINGAPORE

FORWARD MARKETING (SINGAPORE) PTE. LTD.
29, LENG KEE ROAD
SINGAPORE 159099,
PHONE : +65 475 - 4555
FAX : +65 475 - 8623

SHOCK, FIRE HAZARD SERVICE TEST :

CAUTION : After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard NO. 813.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

1. TECHNICAL SPECIFICATIONS

FM Stage

Frequency range	87.5 – 108MHz
Sensitivity	
DIN mono (S/N 26dB, 98MHz, 75Ω)	< 1.1μV
DIN stereo (S/N 46dB, 98MHz, 75Ω)	< 35μV
Adjacent selectivity channel (98MHz, ±300kHz)	> 60dB
Tuner output (1kHz, 75kHz deviation)	1200mV
Signal to noise ratio	
S/N DIN weighted mono	75dB
S/N DIN weighted stereo	69dB
Total harmonic distortion mono (1kHz, 40kHz dev.)	< 0.2%
Total harmonic distortion stereo (1kHz, 40kHz dev.)	< 0.4%
Accuracy of frequency response	
across 30Hz – 15kHz bandwidth	+0.5 / –1.5dB

MW Stage

Frequency range	531 – 1602kHz
Sensitivity (S/N 20dB, 30% mod., 999kHz)	< 2500μV/m
Selectivity (999kHz, 9kHz)	> 28dB

LW Stage

Frequency range	153 – 281kHz
Sensitivity (S/N 20dB, 30% mod., 207kHz)	< 4000μV/m

POWER REQUIREMENTS

/ 02 version	230V AC, 50 / 60Hz
/ 05 version	240V AC, 50 / 60Hz
/ 01 version	110 – 120 / 220 – 240V AC, 50 / 60Hz

2. TEST MODE

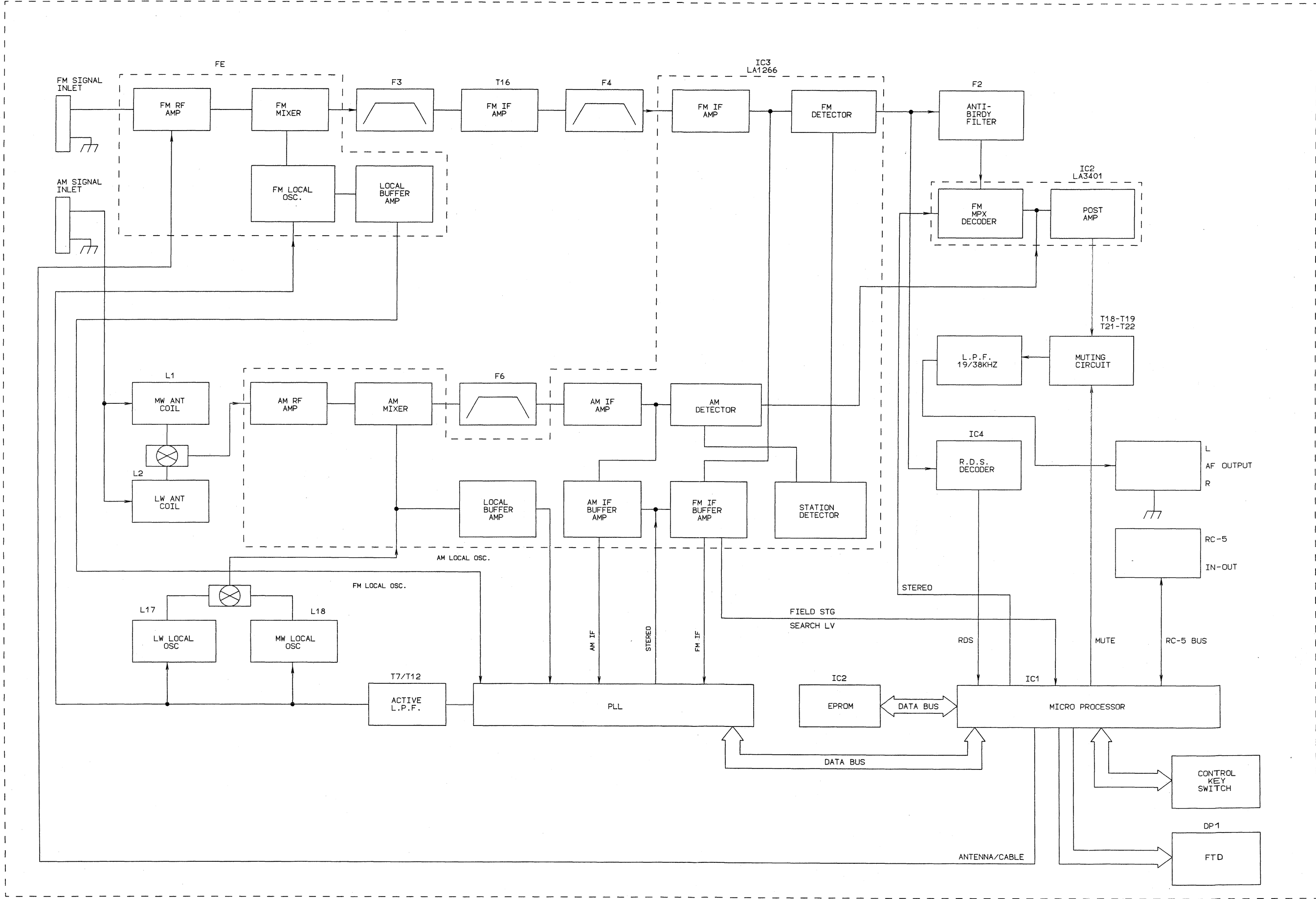
To start the Test press and hold the buttons "MEMO" and "BAND" simultaneously while switching on with the "POWER" button.

- Now all segments in the display will be illuminated one after another.



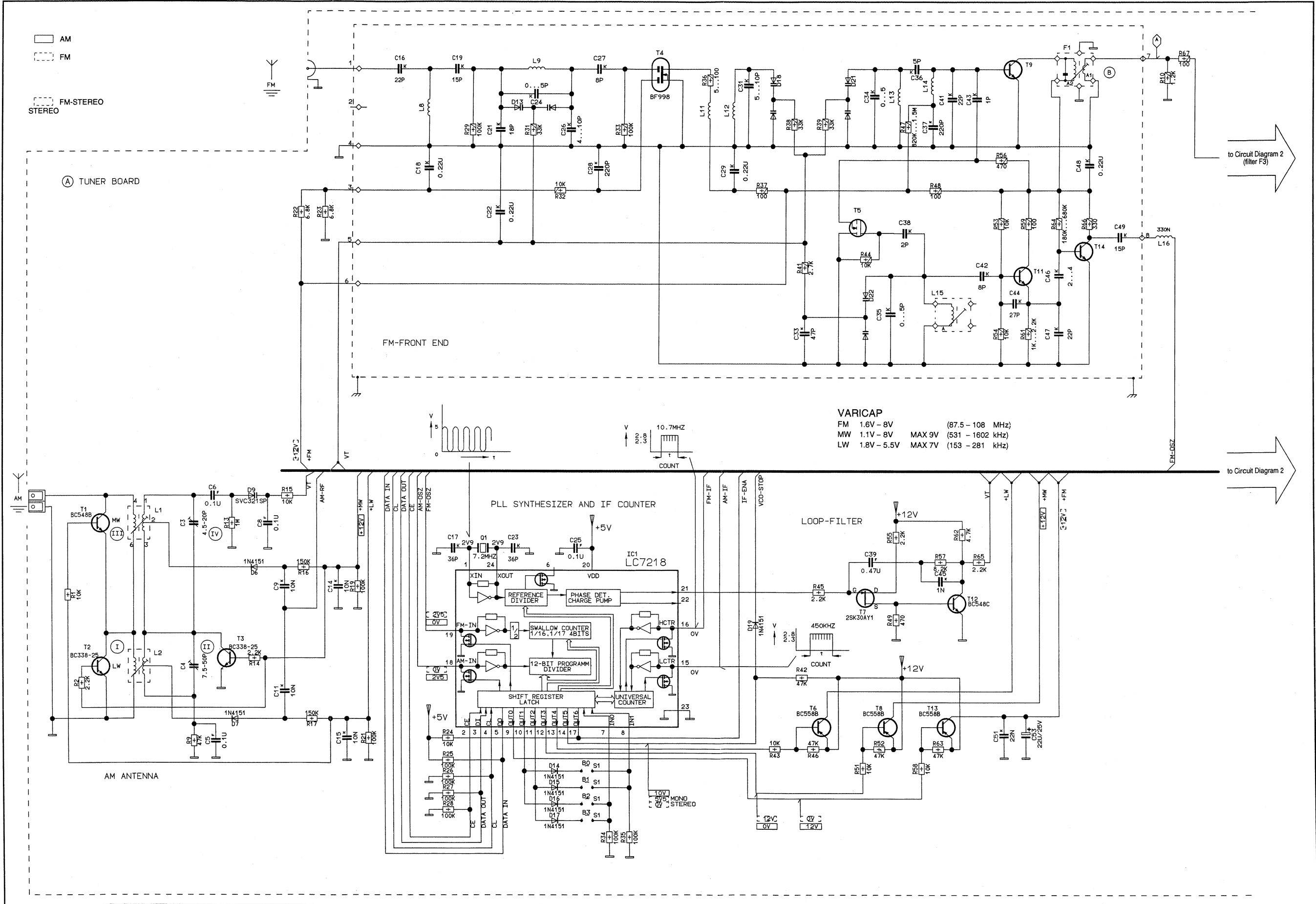
To end the test mode switch off the unit.

3. BLOCK DIAGRAM



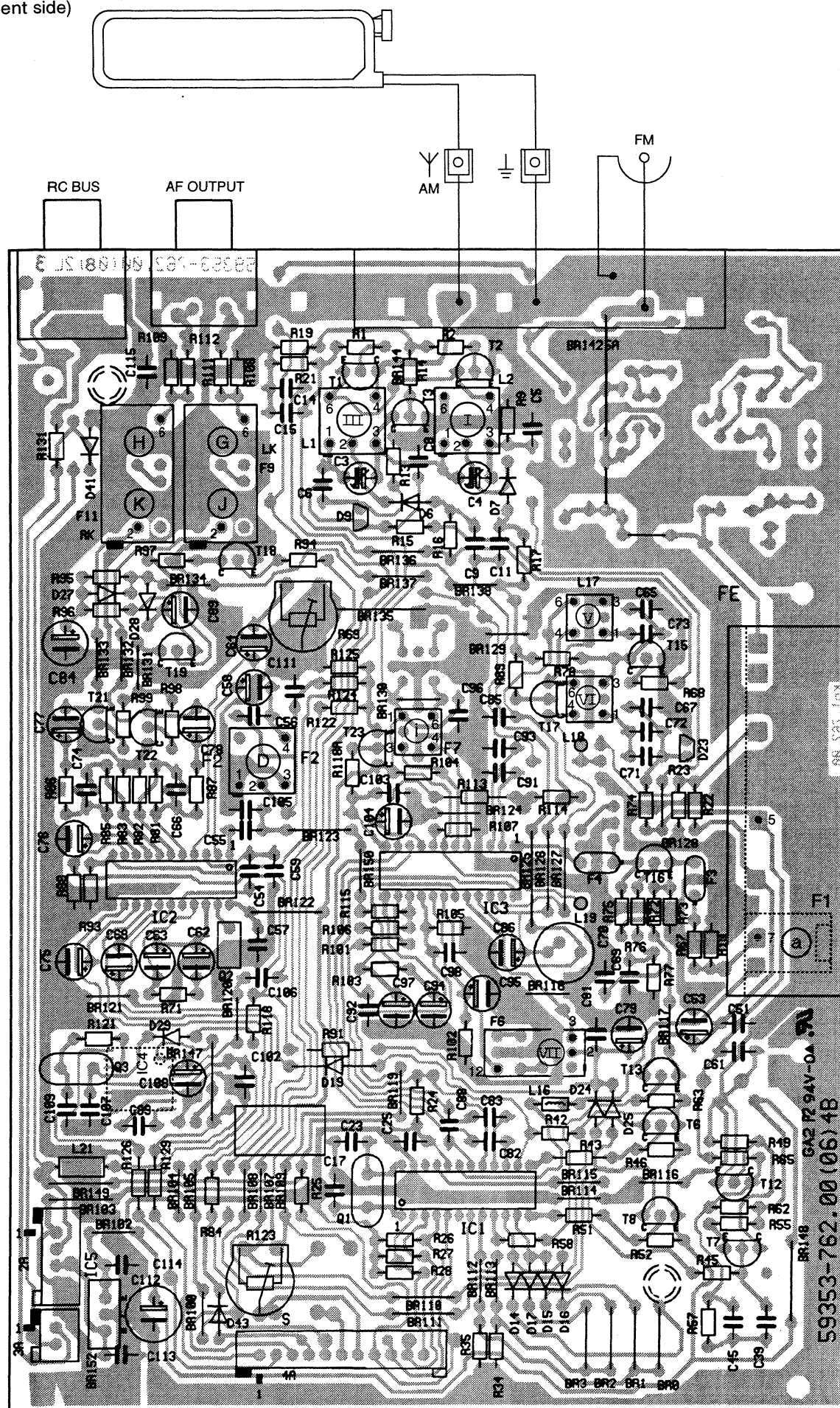
4. SCHEMATIC DIAGRAM AND PARTS LOCATION (Pattern Side)

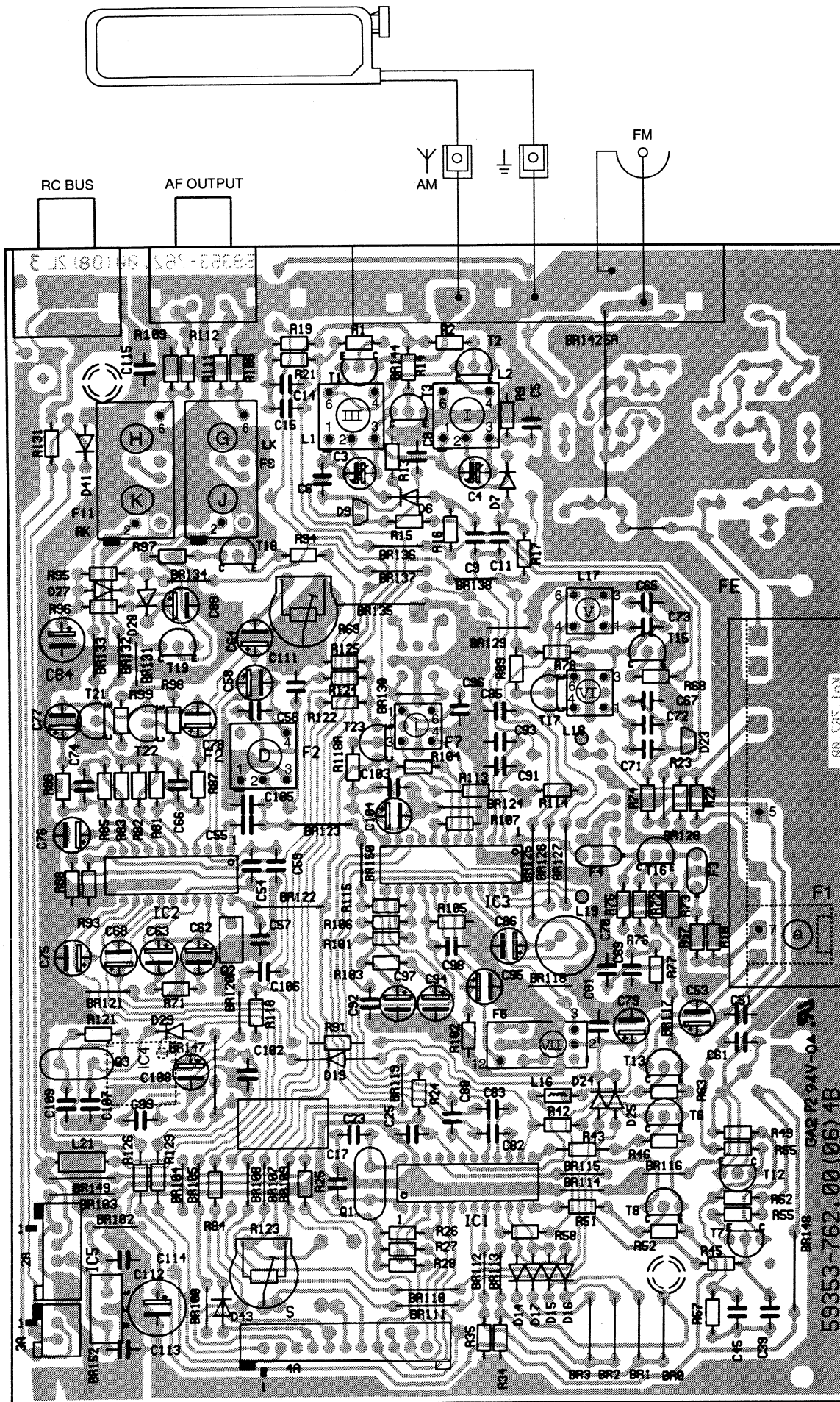
4.1 SCHEMATIC DIAGRAM TUNER BOARD - PART 1



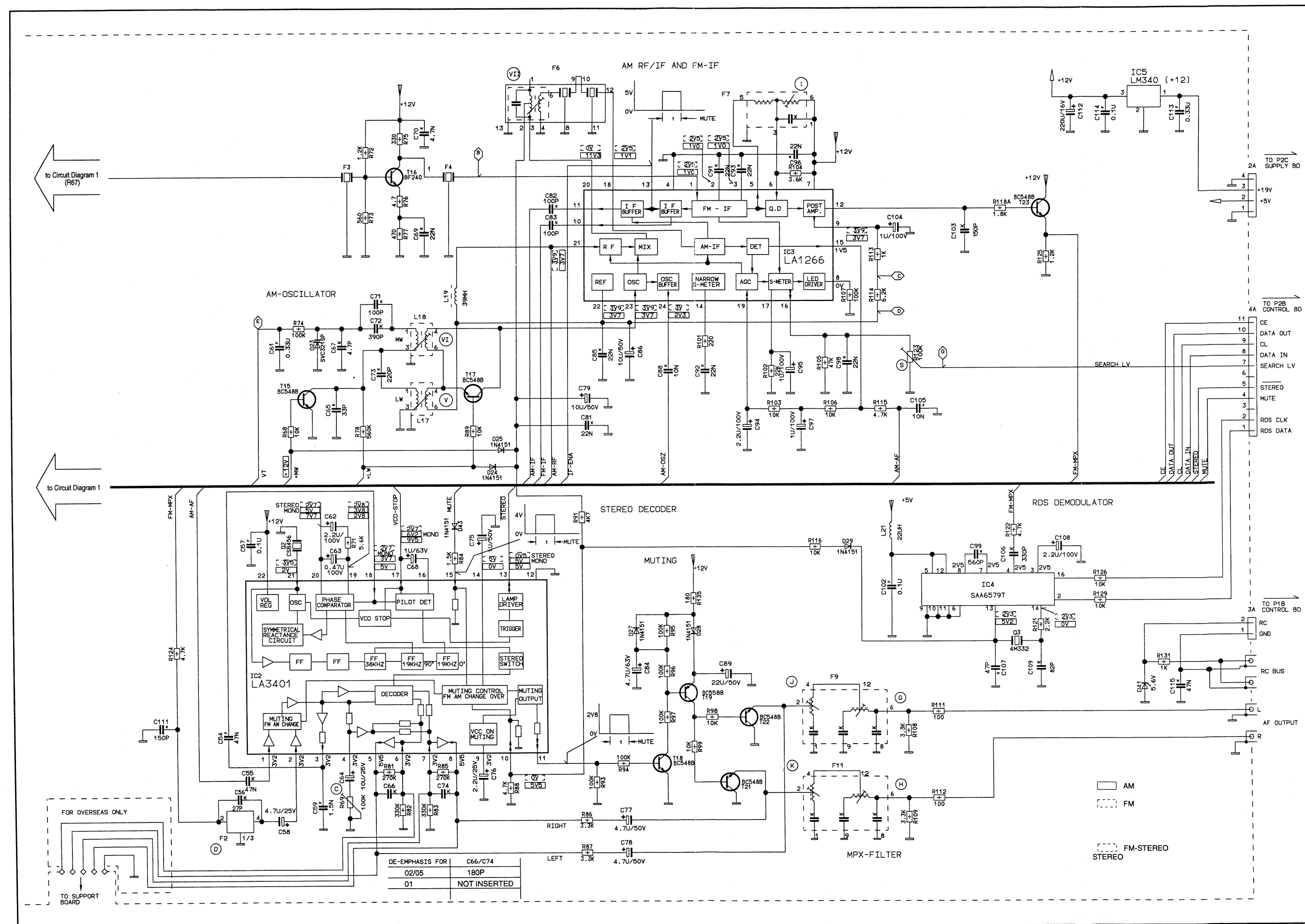
4.2 TUNER PCB

(component side)

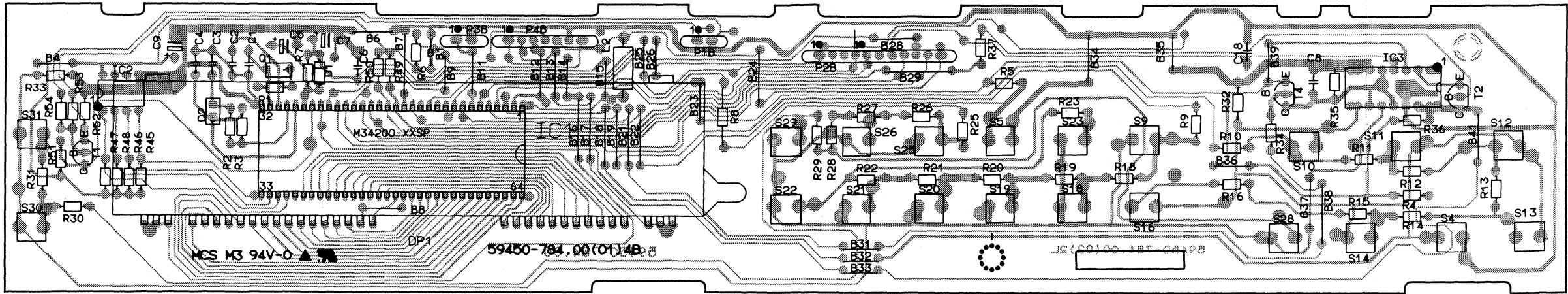




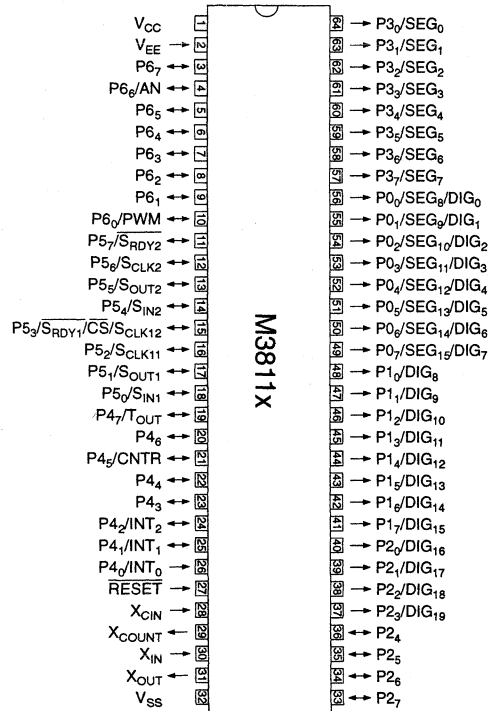
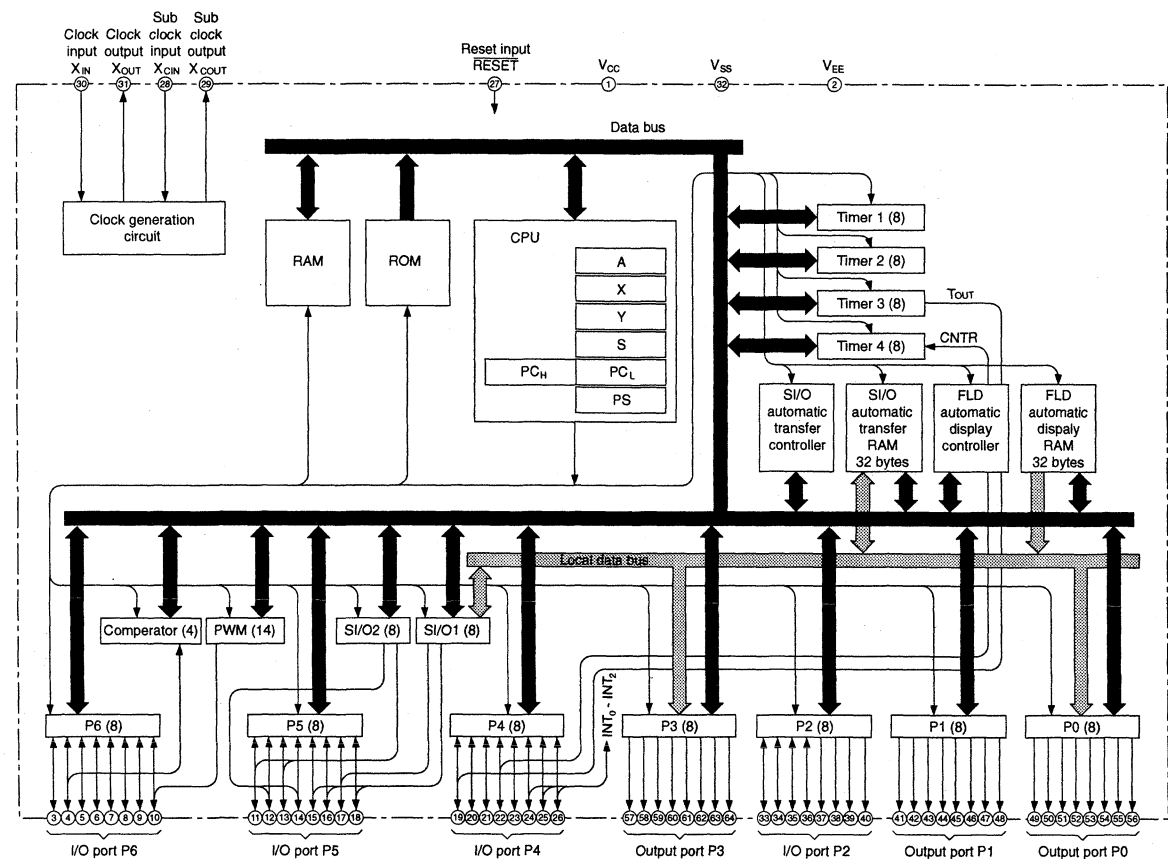
4.3 SCHEMATIC DIAGRAM TUNER BOARD - PART 2



4.5 CONTROL PCB
(component side)



M3811x



PIN DESCRIPTION M3811x

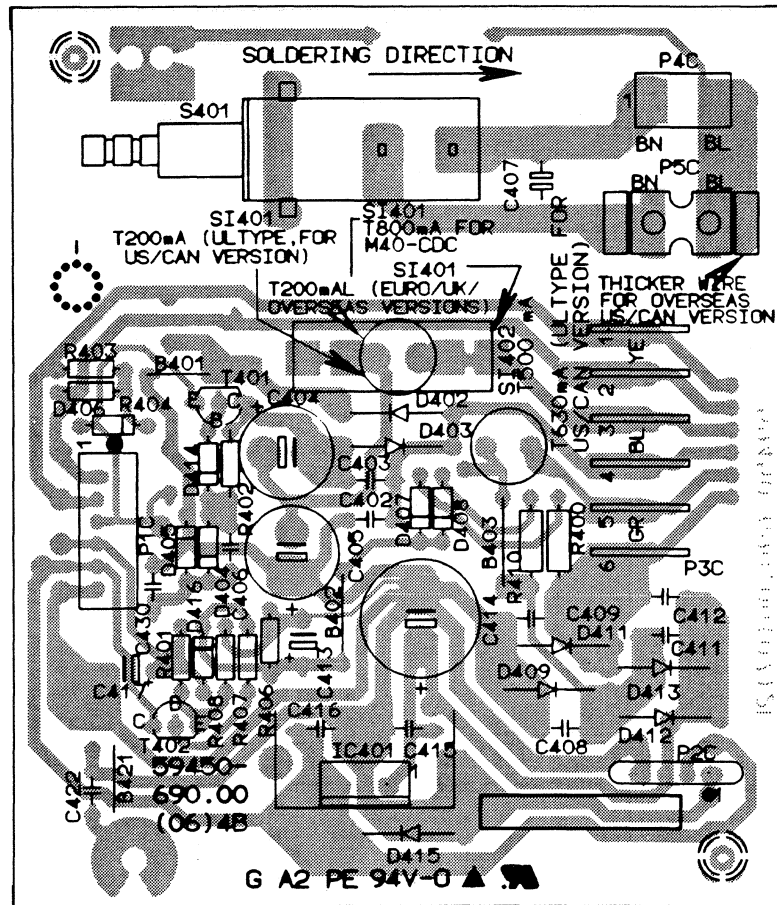
Pin	Name	Function	Alternate Function
VCC, VSS	Power supply	Power supply inputs 4.0 to 5.5V to VCC, and 0V to VSS.	
VEE	Pull-down power input	Applies voltage supplied to pull-down resistors of ports P0, P1, P2, P3 and P3.	
RESET	Reset input	To reset the microcomputer, this pin should be kept at an 'L' level for more than 2μs under high-speed operating conditions. In low-speed operation start mode, internal reset is not released until the X_CIN - X_COUT clock has had time to stabilize.	
X_IN	Clock input	Input and output signals for the internal clock generation circuit. It consist of internal feedback amplifier. Connect a ceramic resonator or quartz crystal between the X_IN and X_OUT pins to set the oscillation frequency. If an external clock is used, connect the clock source to the X_IN pin and leave the X_OUT pin open. This clock is used as system clock.	
X_OUT	Clock output		
X_CIN	Sub clock input	Input and output signals for the internal sub clock generation circuit. It consist of internal amplifier without feedback. Connect a ceramic resonator or quartz crystal and external feedback resistor between the X_CIN and X_COUT pins. If an external clock is used, connect the clock source to the X_CIN pin and leave the X_COUT pin open. This clock can also be used as the system clock.	
X_COUT	Sub clock output		
P0_7/SEG8/DIG0	Output port P0	An 8-bit output port. The output structure is high-breakdown-voltage P-channel open drain with internal pull-down resistors connected between the output and the VEE pin. Are 'L' at reset.	FLD automatic display pins
P1_7/DIG8 - P1_7/DIG15	Output port P1	An 8-bit output port with the same function as port P0.	FLD automatic display pins
P2_7/DIG16 - P2_7/DIG19	Output port	An 4-bit output port with the same function as port P0.	FLD automatic display pins
P2_4 - P2_7	I/O port P2	An 4-bit CMOS I/O port. An I/O direction register allows each pin to be individually programmed as either input or output. At reset this port is set to input mode. The input levels are TTL compatible.	
P3_7/SEG0 - P3_7/SEG7	Output port P3	An 8-bit output port with the same function as port P0.	FLD automatic display pins
P4_7/INT0	Input port P4	A 1-bit CMOS input pin.	External interrupt input pin
P4_1/INT1 - P4_2/INT2	I/O port P4	A 7-bit CMOS I/O port with the same function as port P2_4 - P2_7, with CMOS compatible input levels.	External interrupt input pins
P4_3, P4_4, P4_6			
P4_5/CNTR			Event count input pin
P4_7/TOUT			Timer output pin
P5_7/SIN1, P5_7/SOUT1, P5_2/SCLK11, P5_3/SRDY1/CS/SCLK12	I/O port P5	An 8-bit I/O port with the same function as port P2_4 - P2_7. The output structure of this port is N-channel open drain, and the input levels are CMOS compatible. Keep the input voltage of this port between 0V and VCC.	Serial I/O1 I/O pins
P5_4/SIN0, P5_5/SOUT2, P5_6/SCLK2, P5_7/SRDY2			Serial I/O2 I/O pins
P6_0/PWM	I/O port P6	A 8-bit CMOS I/O port with the same function as port P2_4 - P2_7, with CMOS compatible input levels.	14-bit PWM output pin
P6_1 - P6_5, P6_7			
P6_6/AN			Comparator input pin

PCS 88 322



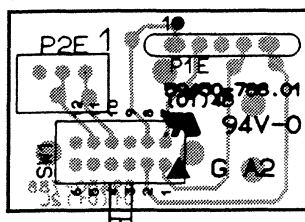
4.7.1 MAINS UNIT PCB

(component side)



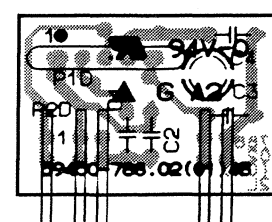
4.7.2 SCAN PCB

(component side)

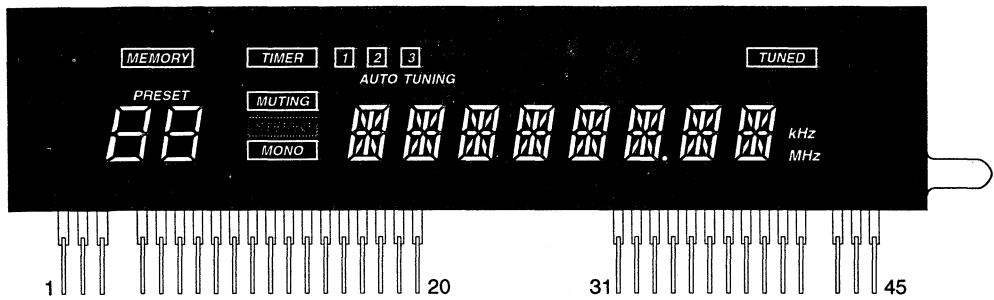


4.7.3 SUPPORT PCB

(component side)

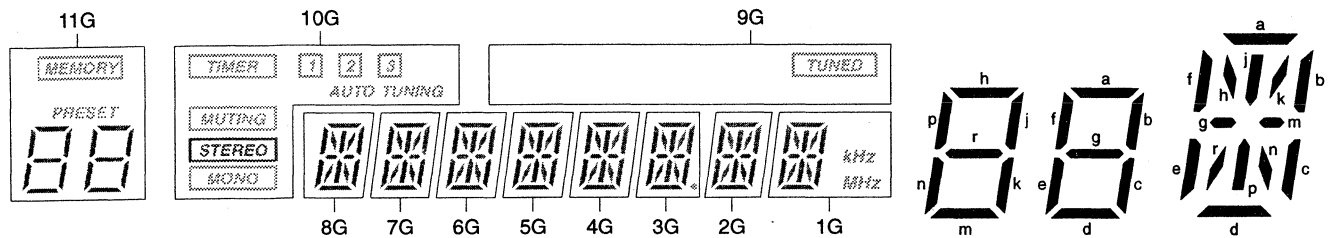


4.8 DISPLAY



PIN CONNECTION

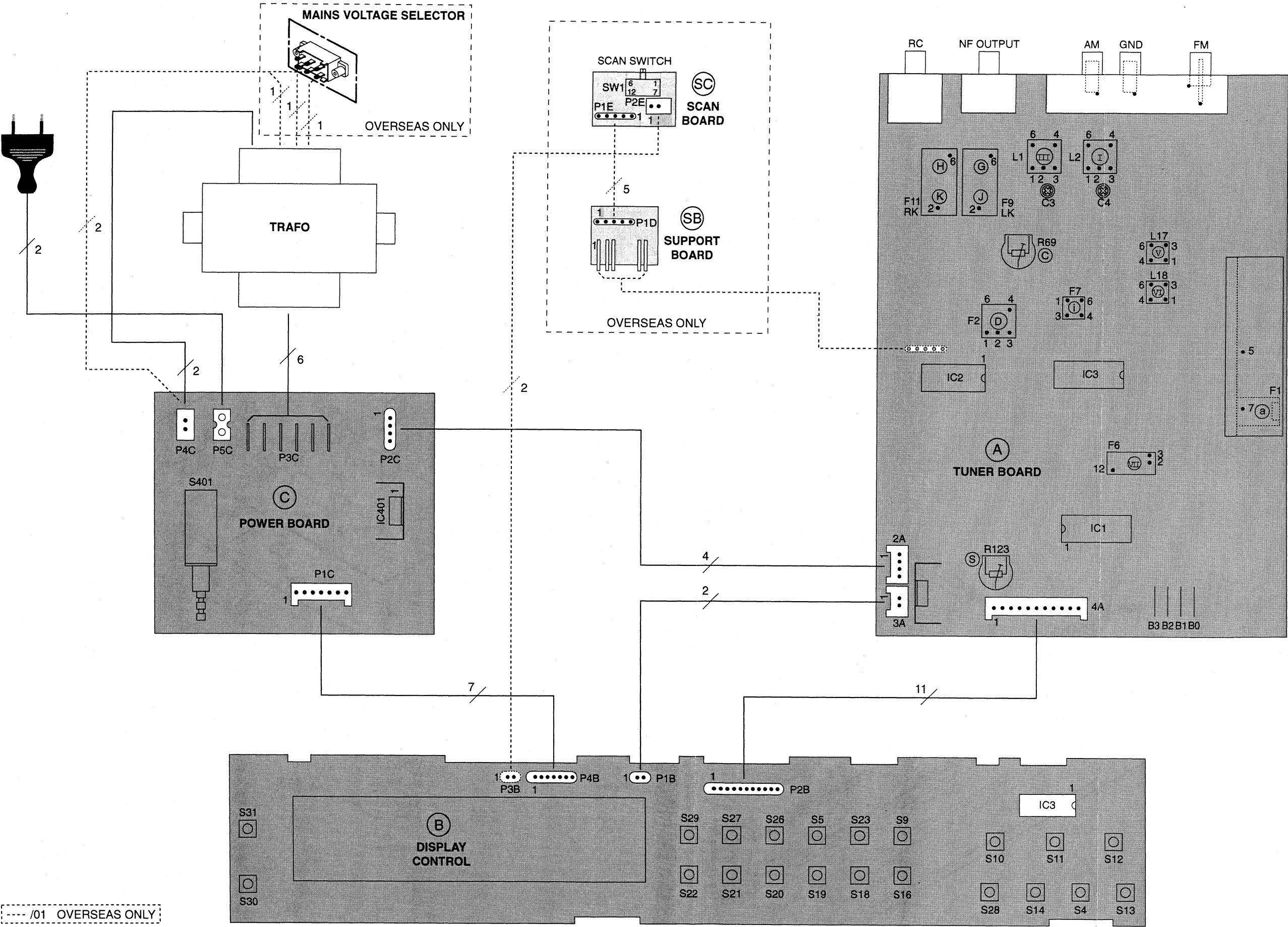
TERMINAL NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	
ELECTRODE	F	F	F	N	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	S15 P	S16 P	N	N	N	N	N	N	N	N	0	1	1	0	9	8	7	6	5	4	3	2	1	N	F	F	F
	1	1	1	P	a	b	f	g	e	c	d	h	j	k	m	n	p	r				P	P	P	P	P	P	P	P	P	P	1	1	0	9	8	7	6	5	4	3	2	1	N	F	F
F --- Filament	NP --- No Pin				P --- Anode				G --- Grid																																					



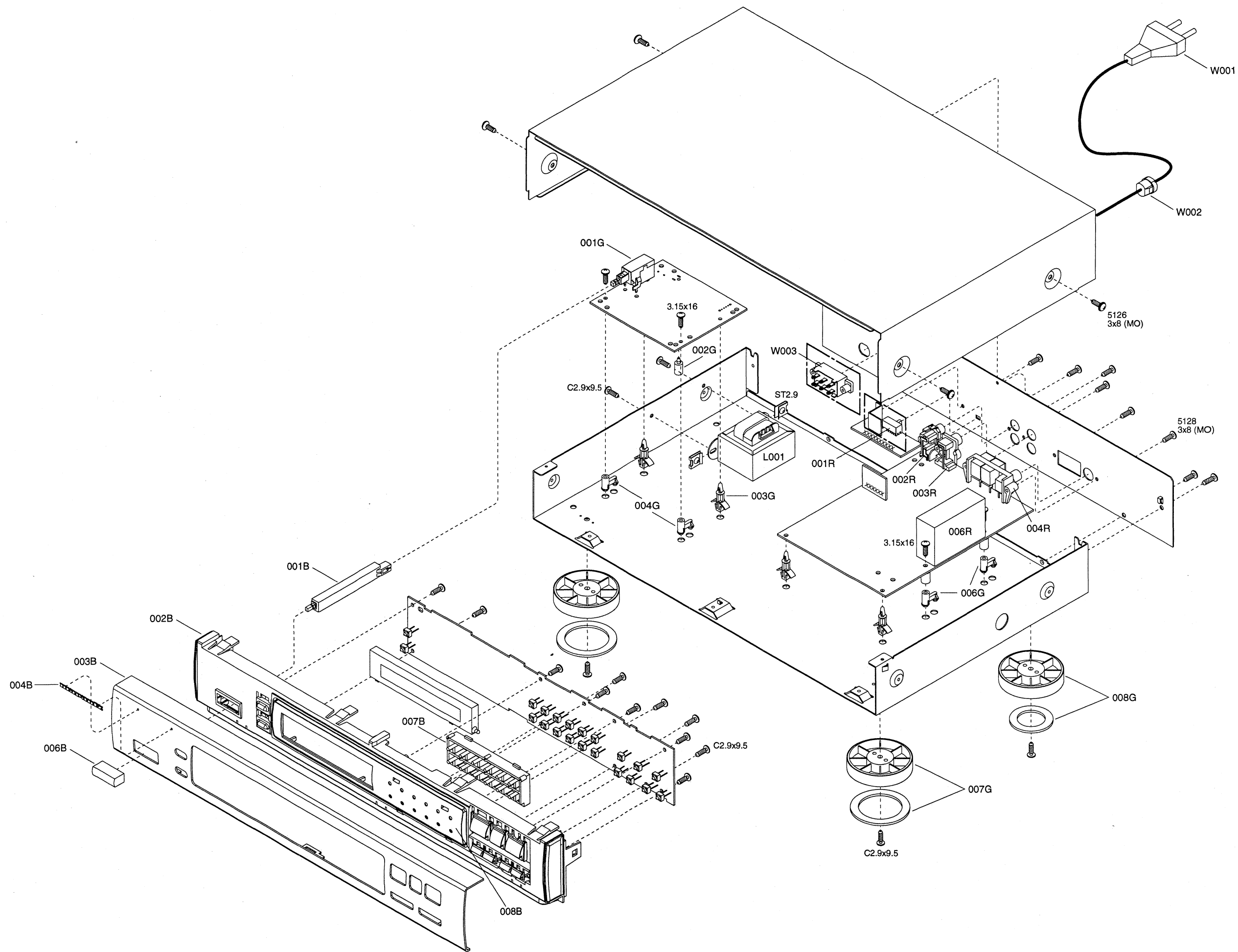
ANODE CONNECTION

	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
Pa	88	5	-	88	88	88	88	88	88	88	88
Pb	88	2	-	88	88	88	88	88	88	88	88
Pf	88	1	-	88	88	88	88	88	88	88	88
Pg	88	TIMER	-	88	88	88	88	88	88	88	88
Pe	88	MUTING	-	88	88	88	88	88	88	88	88
Pc	88	STEREO	-	88	88	88	88	88	88	88	88
Pd	88	MONO	-	88	88	88	88	88	88	88	88
Ph	88	TUNING	-	88	88	88	88	88	88	88	88
Pj	88	AUTO	-	88	88	88	88	88	88	88	88
Pk	88	-	-	88	88	88	88	88	88	88	88
Pm	88	-	-	88	88	88	88	88	88	88	88
Pn	88	-	-	88	88	88	88	88	88	88	88
Pp	88	-	-	88	88	88	88	88	88	88	88
Pr	88	-	-	88	88	88	88	88	88	88	88
PS15	PRESET	-	TUNED	-	-	-	-	-	-	-	MHz
PS16	MEMORY	-	-	-	-	-	-	-	-	-	kHz

5. WIRING DIAGRAM



6. EXPLODED VIEW AND PARTS LIST



(VERS. :VERSION, U:U.S.A, F:JAPAN, K:FAR EAST, **:EUROPE)

POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
001B		4822 404 21348	POWER LINK	QP40421348
002B		4822 459 04439	FRONT PANEL (PLASTIC)	QP45904439
003B		4822 459 04441	FRONT (ALU)	QP45904441
004B		4822 454 11825	MARANTZ BADGE	274H251020
006B		4822 410 63889	MAINS BUTTON	QP41063889
007B		4822 410 63891	12 KEY BUTTON	QP41063891
008B		4822 450 62513	WINDOW	QP45062513
▲ 001G		4822 410 63953	MAINS SWITCH	QP41063953
007G		4822 462 42045	FOOT (FRONT SIDE)	183J057010
008G		4822 462 42048	FOOT (REAR SIDE)	183J057110
▲ L001	/01	4822 146 21835	TRANSFORMER /01	QP14621835
▲ L001	/02/05	4822 146 21834	TRANSFORMER /02/05	QP14621834
001R	/01	4822 276 13635	SWITCH (SCAN) ALPS /01	QP27613635
002R		4822 265 20399	CINCH SOCKET (TWIN) RC-5	QP26520399
003R		4822 265 31305	CINCH SOCKET (TWIN)	QP26531305
004R		4822 267 10296	ANTENNA SOCKET	QP26710296
006R		4822 210 10531	FRONTEND MODEL FE415-G11	QP21010531
▲ W001		4822 321 22917	MAINS CABLE GWN9.17 WF	QP32122917
▲ W003	/01	4822 277 21807	SLIDE SWITCH /01	QP27721807
▲ XX01		4822 265 10777	MAINS CABLE BASE	QP26510777
T001		4822 736 14919	OPERATING INSTRUCTIONS	QP73614919

7. ALIGNMENT PROCEDURES

7.1 FM Alignment Procedures

(Function switch at "FM" position)

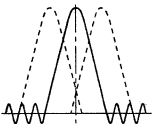
Note: The frontend is a completely preadjusted module. Only the IF-filter must be adjusted to the IF amplifier.

The values of the tuning voltages are:

87.5MHz = typ. 1.6V min 1.3V

108MHz = typ. 8.0V max 9V

• FM IF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1	Connect an FM sweep generator to FM aerial socket. U_{RF} = approx. 100 μ V / 75 Ω	98MHz	Connect an oscilloscope to measuring point 	With IF filter F1 a adjust for maximum level and symmetrical position. 

• FM Demodulator Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1	Connect an FM generator to FM aerial socket. U_{RF} = 1mV / 75 Ω $f_{mod.}$ = 1kHz, Δf = ± 40 kHz	98MHz	Connect a Distortion Analyzer to AF output	With filter F7 i adjust for minimum distortion. (typ. $\leq 0.2\%$)

• FM Search Stop Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1	Connect an FM generator to FM aerial socket. U_{RF} = 15 μ V / 75 Ω	98MHz	DC-VM to measuring point 	With R123 S set to 0.7V +0.05V.

• Multiplex Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1	Connect a stereo encoder to FM aerial socket.	106MHz $L_{mod.}$ = 1kHz	Connect AC-VM to AF-output "R"	With R69 C adjust for maximum and symmetrical crosstalk attenuation.
2		106MHz $R_{mod.}$ = 1kHz	Connect AC-VM to AF-output "L"	
3	Connect an FM generator to FM aerial socket.	98MHz $f_{mod.}$ = 38kHz	Connect AC-VM to AF-output	With F9 J, F11 K adjust for minimum level.
4		98MHz $f_{mod.}$ = 19kHz		With F9 G, F11 H adjust for minimum level.

• Adjacent Channel Filter Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1	Connect an AF generator to the input of F2 (Pin 2). U_{AF} = approx. 100mV	114 kHz	Connect AC-VM to the output of F2 (Pin 4).	With F2 D adjust for minimum level.

7.2 AM Alignment Procedures

(Function switch at "AM" position)

• MW/LW Oscillator Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1		531kHz (MW)	Connect DC-VM to measuring point 	With L18  set the tuning voltage to 1.1V.
2		153kHz (LW)		With L17  set the tuning voltage to 1.8V.

• AM RF IF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1	Feed in an AM generator signal via a frame aerial. U_{RF} as low as possible $m = 30\%$, $f_{mod.} = 1\text{kHz}$	1449kHz	Connect AC-VM to AF-output	With C3 (IV) and the IF Filter F6 (VII) set U_{AF} to maximum level.
2		558kHz		With L1 (III) set U_{AF} to maximum level.
3	Repeat the adjustment of C3 and L1 until sensitivity is maximized, end with C3.			

• LW RF IF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Adjust
1	Feed in an AM generator signal via a frame aerial. U_{RF} as low as possible $m = 30\%$, $f_{mod.} = 1\text{kHz}$	261kHz	Connect AC-VM to AF-output	With C4 ② set U_{AF} to maximum level.
2		162kHz		With L2 ① set U_{AF} to maximum level.
3	Repeat steps 1 and 2 until sensitivity is maximized, end with C4.			

• FM IF offset

The ceramic resonators have different intermediate frequencies as a result of tolerances. Dependent on the IF, a jumper has to be closed or a jumper has to be opened. B0 – B3 (see table).

The resonators have been provided with a colour code.

When replacing one of the ceramic resonators, take care that the colours codes of all resonators are the same.

 Measuring point

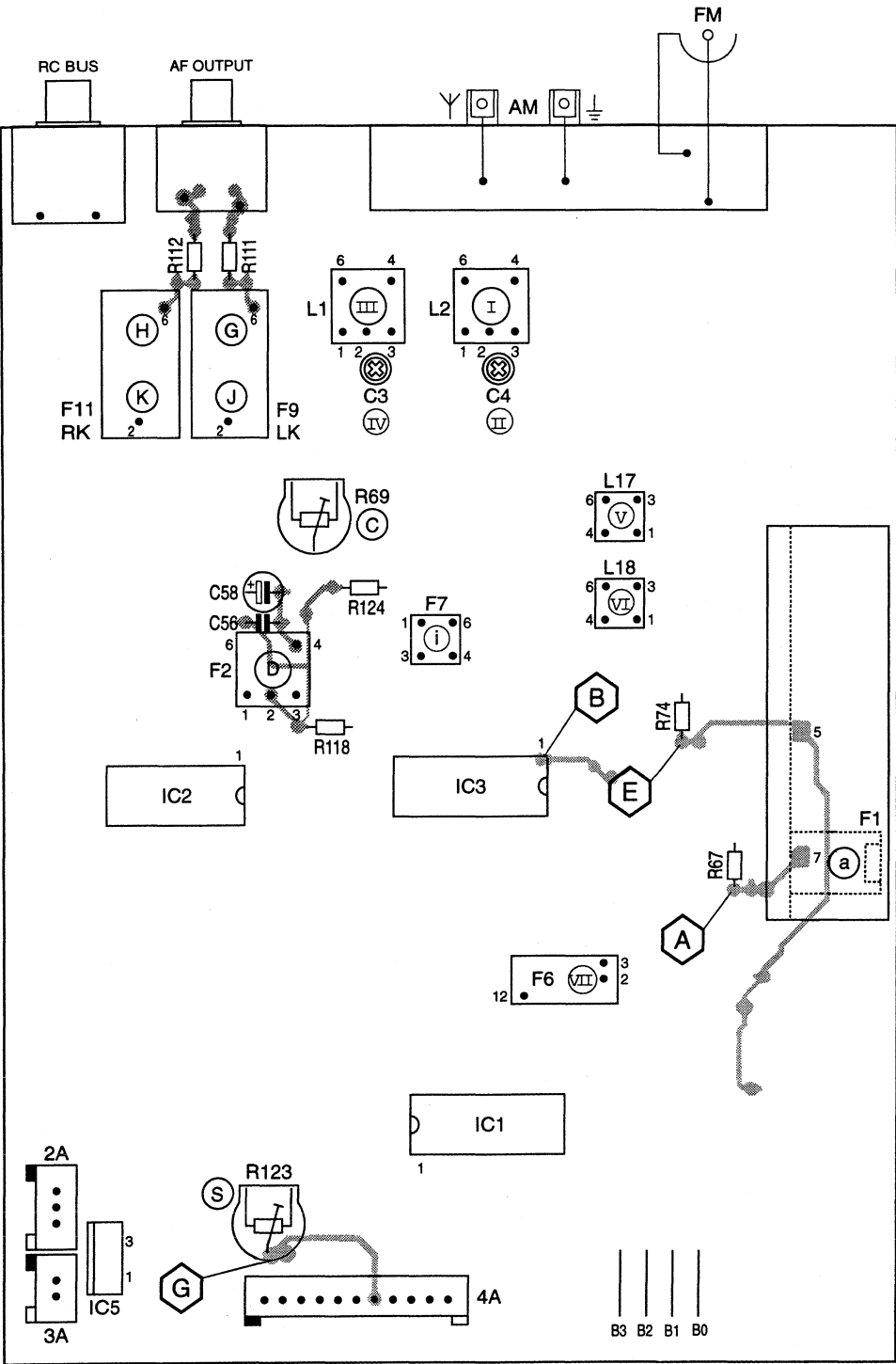
 Trimming point

IF (MHz)	Jumper				Filter color
	B 3	B 2	B 1	B 0	
10.6500	0	1	0	0	Black
10.6750	0	1	1	0	Blue
10.7000	1	0	0	0	Red
10.7250	1	0	1	0	Orange
10.7500	1	1	0	0	White

0 = jumper open

1 = jumper closed

7.3 Tuner Alignment Points



8. ELECTRICAL PARTS LIST

(VERS. :VERSION, U:U.S.A, F:JAPAN, K:FAR EAST, **:EUROPE)

POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
C3		4822 125 60222	CAPACITORS	QP12560222	T16		4822 130 40902	TRANS BF240	QP13040902
C4		4822 125 60223	TR.53 4.5-20pF	QP12560223	T17		4822 130 40937	TRANS BC548B	QP13040937
▲ C407		4822 126 11805	TR.55 7.5-45pF	QP12611805	T18		4822 130 40937	TRANS BC548B	QP13040937
▲ C414		4822 124 11861	SI-KERKO.A 3300pF 20%	QP12411861	T19		4822 130 44197	TRANS BC558B	QP13044197
			ELKO 2200μF 20% 35V		T21				
					I		4822 130 40937	TRANS BC548B	QP13040937
					T23				
D1		5322 130 34052	SEMICONDUCTORS	QQ13034052	T401		4822 130 41246	TRANS BC327-25	QP13041246
D6		5322 130 34052	DIODE 1N4151	QQ13034052	T402		4822 130 40937	TRANS BC548B	QP13040937
D7		5322 130 34052	DIODE 1N4151	QQ13034052					
D9		4822 130 82789	DIODE 1N4151	QQ13034052					
D14			DIODE SVC321SP-A/B/C/D	QP13082789					
I		5322 130 34052	DIODE 1N4151	QQ13034052				RESISTORS	
D17					R69		4822 100 20694	ESTR.SK10-A 100kΩ LIN	QP10020694
					R123		4822 100 20694	ESTR.SK10-A 100kΩ LIN	QP10020694
D19		5322 130 34052	DIODE 1N4151	QQ13034052				MISCELLANEOUS	
D23		4822 130 82789	DIODE SVC321SP-A/B/C/D	QP13082789	DP1		4822 130 91507	FL DISPLAY	QP13091507
D24		5322 130 34052	DIODE 1N4151	QQ13034052					
D25		5322 130 34052	DIODE 1N4151	QQ13034052					
D27					F2		4822 214 51727	FILTER (ADJACENT CHANNEL)	QP21451727
I		5322 130 34052	DIODE 1N4151	QQ13034052	F3		4822 157 62739	KERAMIK-FILTER 70	QP15762739
D29					F4		4822 157 62739	KERAMIK-FILTER 70	QP15762739
					F6		4822 242 71509	AM-IF SFL 450 J3	FF10045330
					F7		4822 156 11092	FM-DEM.I	QP15611092
D41		4822 130 34173	Z DIODE 5.6V C 0.5W	QP13034173					
D43		5322 130 34052	DIODE 1N4151	QQ13034052	F9		4822 156 11104	FILTER (PILOT) LPF-V20	QP15611104
D402		5322 130 30684	DIODE 1N4002-GA	QQ13030684	F11		4822 156 11104	FILTER (PILOT) LPF-V20	QP15611104
D403		5322 130 30684	DIODE 1N4002-GA	QQ13030684					
D404		4822 130 83968	Z-DIODE 15V C 0.5W	QP13083968	L1		4822 156 11094	MW-RF CIRCUIT.	QP15611094
					L2		4822 157 11068	DR AX 0309-GA 22μH	QP15711068
D405		4822 130 34499	Z DIODE 20V C 0.5W	QP13034499	L17		4822 156 11091	COIL (LW-OS)	QP15611091
D406		4822 130 33783	Z DIODE 6.8V C 0.5W	QP13033783	L18		4822 156 11089	COIL (MW-OS)	QP15611089
▲ D407		4822 130 30621	DIODE 1N4148	QP13030621	L16		4822 157 70423	DR AX 0207-GA 0.33μH	QP15770423
▲ D408		4822 130 30621	DIODE 1N4148	QP13030621					
▲ D409		5322 130 30684	DIODE 1N4002-GA	QQ13030684	L19		4822 157 53632	INDUCTOR 39mH 5%	QP15753632
					L21		4822 157 11068	DR AX 0309-GA 22μH	QP15711068
▲ D411									
I		5322 130 30684	DIODE 1N4002-GA	QQ13030684	Q1		4822 242 72294	CRYSTAL 7.2MHz	QP24272294
▲ D413					Q2		4822 242 72295	CER.RES.10 CSB456F11	QP24272295
D414		4822 130 30621	DIODE 1N4148	QP13030621	Q3		4822 242 81319	CRYSTAL #170 A/C 4.332MHz	QP24281319
▲ D415		5322 130 30684	DIODE 1N4002-GA	QQ13030684	Q01		4822 242 72296	CER.RES.87 4.19MHz	QP24272296
D416		4822 130 31353	DIODE TYP5 BAT42	QP13031353	S4		4822 410 62446	TACT SWITCH	QP41062446
					S5		4822 410 62446	TACT SWITCH	QP41062446
IC1		4822 209 30178	IC LC7218 SANYO	QP20930178	S9		4822 410 62446	TACT SWITCH	QP41062446
IC2		4822 209 73434	IC LA3401 SANYO	QP20973434	S10				
IC4		4822 209 31981	IC LA1266 SANYO	QP20931981	I		4822 410 62446	TACT SWITCH	QP41062446
IC5		4822 209 33347	IC LM340AT-12 NSC	QP20933347	S14				
IC01		4822 209 15286	IC M38112E4SP PROG.KPL	QP20915286					
					S16		4822 410 62446	TACT SWITCH	QP41062446
IC02		4822 209 31819	IC XLS93C66P	QP20931819	S18				
▲ IC401		5322 209 86518	IC MC7805 CT	QQ20986518	I		4822 410 62446	TACT SWITCH	QP41062446
					S23				
T1		4822 130 40937	TRANS BC548B	QP13040937	S25		4822 410 62446	TACT SWITCH	QP41062446
T2		4822 130 40937	TRANS BC548B	QP13040937					
T3		5322 130 44779	TRANS BC338-25	QQ13044779	S26		4822 410 62446	TACT SWITCH	QP41062446
T4		4822 130 44197	TRANS BC558B	QP13044197	S28				
T6		4822 130 44197	TRANS BC558B	QP13044197	I		4822 410 62446	TACT SWITCH	QP41062446
					S31				
T7		4822 130 42121	TRANS 2SK30A-TM-Y1	HF200300B0					
T8		4822 130 44197	TRANS BC558B	QP13044197	▲ SI401		4822 071 52001	FUSE-GR 200mA/T	QP07152001
T12		4822 130 44196	TRANS BC548C	QP13044196	▲ SI402		4822 071 55001	FUSE-GR 500mA/T	QP07155001
T13		4822 130 44197	TRANS BC558B	QP13044197					
T15		4822 130 40937	TRANS BC548B	QP13040937					

NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replaced any part marked with symbol ▲. Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replaced any part marked with symbol ▲. Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.